SECTION 02225

TRENCHING

****
Edit to suit project requirements.
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PART 1 GENERAL

1.1 SECTION INCLUDES

A. Excavate trenches for utilities to existing site utilities, drain lines and storm sewers.

B. Compacted bed and compacted fill over utilities.

C. Compaction requirements.

1.2 LANL PERFORMED WORK

A. Trenching compaction testing

B. Obtain excavation/soil disturbance permit for Contractor

1.3 SUBMITTALS

A. Submit the following in accordance with the requirements of Section 01300:

1. Material certifications meeting the specifications for pipe bedding materials from an independent testing laboratory.

2. Material certifications meeting the specifications for crushed stone or crushed or screened gravel from an independent testing laboratory.

1.4 QUALITY ASSURANCE

A. When work or portions of work of this Section are completed and require testing, notify the Contract Administrator.

B. Ensure compacted fills are tested in accordance with Section 3.5 and are in compliance before proceeding with placement of next lift.

C. Do not begin any ground breaking until the known utilities have been marked and an excavation/soil disturbance permit has been issued to the Contractor.

1.5 JOB CONDITIONS

A. Do not place and compact backfill material when the atmospheric temperature is below 35 degrees F, unless approved by the Construction Inspector.

1.6 REGULATORY REQUIREMENT

A. Comply with OSHA 2207, 29CFR 1926, during trenching operation.

1.7 PROTECTION

A. Protect existing structures from equipment and vehicular traffic.

B. Protect existing utilities.

C. Maintain excavation free of standing water.

D. Notify Construction Inspector of unexpected subsurface conditions and discontinue affected work in area until notified to resume work.

E. Protect bottom of excavations and soil adjacent to and beneath foundations from frost.

F. Grade top perimeter of excavation to prevent subsurface water run-off into excavation.

PART 2 PRODUCTS

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Specify materials used to backfill trenches.
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2.1 SELECT BED AND FILL MATERIALS

A. Provide pipe bedding material (sand) free of any organic or deleterious substance and having 100 percent passing 3/8 inch sieve and 0 to 10 percent passing No. 200 sieve.

B. Provide fill and backfill consisting of non-plastic granular soils free of organic or other deleterious materials and should have a maximum particle size of 2 inches.

C. Provide crushed stone and/or crushed or screened gravel free of any organic or deleterious substance and having 100 percent passing 1 inch sieve and 0 percent passing the 1/2 inch sieve.

D. Identification Tape

1. Use non-detectable plastic identification tape consisting of high visibility, color-coded, inert fiber reinforced polyethylene.

2. Provide tape to the following criteria:

a. Minimum overall thickness: 4.0 mils.

b. Minimum tensile strength: 1500 psi.

c. Minimum weight: 10 pounds per 1000 per foot unit.

d. Maximum imprint length: 36 inches.

e. Width: 6 inches.

3. Provide tape conforming to the APWA Recommended Color Code.

4. Use Seton Name Plate Co. or approved equal

E. Provide tracing wire at nonmetallic and ductile iron pipes.

1. Wire: #10AWG EPR-USE (no splices)

PART 3 EXECUTION

3.1 INSPECTION

A. Verify stockpiled fill to be reused is approved by the Construction Inspector.

B. Verify areas to be backfilled are free of debris, snow, ice, or water, and surfaces are not frozen.

3.2 PREPARATION

A. Identify required contours and datum.

B. When necessary, compact subgrade surfaces to density requirements for backfill material.

C. Notify the Construction Inspector 5 days prior to startup of construction to have LANL's support services subcontractor identify known underground utilities and stake and flag locations. If a conflict exists between the location of such obstacles and the proposed work, promptly notify the Construction Inspector and arrange for relocations. Proceed in the same manner if a rock layer or any other condition encountered underground makes changes advisable.

3.3 TRENCHING

A. Trench subsoil required for piping.

B. Cut trenches sufficiently wide to enable installation of utilities and to allow inspection. See Drawings.

C. Hand trim excavation and leave free of loose matter.

D. Remove lumped subsoil, boulders, and rock.

E. Do not interfere with the normal 45 degree bearing splay of foundations during excavation work.

F. Correct errors in trenching.

G. If the excavation path will cross or come within 3 feet of a locate mark, hand excavate until the marked utility has been found and exposed. Expose the marked utilities before machine excavation commences.

NOTE: A vacuum excavation technique, such as an air lance, may be used as an alternative to hand tool excavation for exposing marked utilities.

H. If the hand excavation has gone 1 foot deeper than required and three feet to the left and right of a locate mark without finding the utility, stop excavating and contact the Construction Inspector for consultation and remarking.

I. Protect exposed underground utilities with a plank, shovel, or other physical barrier so that the equipment operator can clearly see and avoid contact with the utilities.

J. Machine excavation may commence beyond 3 feet of the underground utility only after the utility has been fully exposed and protected and the Contractor is confident that there are no unexposed utilities in the excavation area.

3.4 BACKFILLING

A. Support pipe and conduit during placement and compaction of bedding fill.

B. Backfill trenches to contours and elevations. Backfill systematically, as early as possible, to allow maximum time for natural settlement. Do not backfill over porous, wet, or spongy subgrade surfaces.

C. Place and compact fill materials in continuous layers not exceeding 8 inches loose depth.

D. Maintain optimum moisture content of backfill materials to attain required compaction density.

E. Install non-detectable plastic identification as shown on the Drawings.

F. Install tracing wire along all buried non-metallic and ductile iron pipes.

3.5 COMPACTION

A. Control soil compaction during construction to provide the minimum percentage of density specified for each area as determined according to ASTM D1557, method A or D.

B. Where subgrade or layer of soil material must be moisture-conditioned before compacting, uniformly apply water to surface of subgrade or layer material to prevent free water appearing on surface during or subsequent to compacting operations.

C. Remove and replace, or scarify and air dry, soil material that is too wet to permit compacting to the specified density.

D. The allowable percent variation from optimum moisture is minus 0 percent to plus 2 percent.

E. The paragraphs below identify location, and compaction expressed as a percentage of maximum density and optimum moisture in comparison with ASTM D1557.

1. Compact fill beneath concrete and asphalt structures to [95 percent] of maximum density.

2. Compact fill beneath unpaved areas to [90 percent] of maximum density.

3.6 FIELD QUALITY CONTROL

A. A certified independent testing agency will be employed by LANL to perform testing.

B. The Contractor is responsible for the following:

1. Verify all fill material to be placed is within the specifications of Section 2.1, and all laboratory testing is complete.

2. Verify that moisture-density relationship, ASTM D1557, for each soil type to be placed is completed.

C. LANL will perform the following testing:

1. Determine field density of in-place material in accordance with any of the following methods:

a. Nuclear Method, ASTM D2922,

b. Rubber-Balloon Method, ASTM D2167.

c. Sand-Cone Method, ASTM D1556.

2. Determine field moisture content in accordance with either of the following methods:

a. Nuclear Method, ASTM D3017, or

b. Laboratory Determination, ASTM D2216.

3. Frequency of Tests

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Specify location and frequency of testing.
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a. One test per [50 feet] of trench per 8 inch maximum lift.

END OF SECTION